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A NEW GENUS OF WATER BEETLE FROM AUSTRAL SOUTH AMERICA (COLEOPTERA: HYDROPHILIDAE)

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Abstract.—Descriptions and illustrations are given for the adult, larva, and pupa of a hydrobiine water beetle, *Anticura flinti,* new genus, new species, collected from Chile and Argentina. These forms are interpolated into existing keys. Pupation, habitat, collecting methods, and behavior are discussed. The adults are the first hydrophilids known to have dimorphic metathoracic wings and this condition is also discussed.

A single female of this new genus was collected in 1974 from San Martin de los Andes, Argentina, by my colleague Dr. Oliver S. Flint, Jr. Although the temptation to describe the genus on the basis of the single female was strong, it seemed prudent to wait for more material; so the female was put aside until, hopefully, more specimens of both sexes could be obtained. In this instance patience was rewarded.

The habitat of the single specimen collected by Flint was not known with certainty. Dr. Flint was collecting larvae and adults of Trichoptera from a small fast flowing stream when he collected the beetle, and it seemed probable that the specimen was found in piles of partly submerged driftwood or logjam habitats in the stream or at the margin of the stream. This type of habitat is similar to those in which we sometimes find *Ametor latus* (Horn) and *A. scabratus* (Horn) in the northwestern United States, *Sperchopsis tessellatus* Ziegler and *Hydrobius melaenus* (Germar) in the eastern United States, and *Hydramara argentina* Knisch in northwestern Argentina. Therefore, when the recent opportunity became available to go to Chile to participate in fieldwork in the mountains on the Chilean-Argentinian border, a search for this beetle was a first priority. Our work was centered in the region around Anticura in Puyehue National Park in Osorno Province. There we encountered dry weather which reduced stream flow in local streams and made collecting in them easy. The cold, cloudy, and misty mornings usually turned to warm, clear days by noon, and the surrounding mountains, volcanos, forests of *Nothofagus,* and the cold clean trout streams added to the esthetic pleasures of collecting in this area. A small stream, the Rio Anticura, flowed through the park and appeared to be a good one in which to search for the undescribed genus if it indeed occurred in this area. Therefore, I was delighted to discover a single hydrophilid larva in a logjam during

the first afternoon of collecting in the Rio Anticura. The larva had to be the undescribed larva of *Hydramara argentina* or, as it proved to be, the larva of the undescribed genus. The find was exciting, and it held promise of additional interesting specimens. On the second day of collecting we explored the nearby Gol Gol River, and there Dr. Flint found a single adult of the undescribed genus. This adult was found, seemingly aestivating, under a rock in damp sand about 2 meters from a pool in the streambed. Knowing now that the undescribed genus occurred in the area, I returned to the Rio Anticura and began examining logjams in earnest. Finally my efforts were successful, and by the end of the day I had collected 34 adults and 15 larvae of the new genus. The size of a number of the larvae suggested that with intensive searching, a pupa might also be found. Additional collecting, mostly in the Rio Anticura, during the next 12 days provided a total of 73 adults and 26 larvae of the new genus but no pupae. Therefore, finding a single pupa with its shed larval skin during my last day of collecting was especially rewarding. During the entire collecting period a search was made for eggs or egg cases, but none was found; probably it was too late in the breeding season. All 73 specimens of the new genus found in the Rio Anticura were collected in the river behind the park headquarters at Anticura.

Hydrobiinae

Anticura, new genus

Body form (Fig. 1) broadly ovate, moderately convex. Head (Figs. 2, 3, 4) with clypeus expanded shelflike in front of eyes and strongly emarginate medially on anterior margin. Labrum similarly emarginate medially and anterior margin barely visible beneath clypeus. Eyes viewed from above ovoid. Antenna (Fig. 4) 9 segmented; 2 basal, 3 intermediate, 1 cupule, and 3 club segments; only club segments pubescent. Maxillary palpus (Fig. 4) moderately long, robust, and 4 segmented; basal segment very short; second (pseudobasal) segment longest, subequal to ultimate and penultimate combined; ultimate segment subequal to penultimate segment. Prosternum not carinate medially, terminating posteromedially in a bisinuate border, and lacking a prosternal process. Mesosternum (Fig. 5) with short, feeble longitudinal carina between apical halves of mesocoxae and behind a low, transverse arcuate ridge across posterior third of mesosternum. Metasternum apically with short narrow carina between and slightly behind posterior halves of mesocoxae (Fig. 5); disc of metasternum higher than sides and bearing a narrow, longitudinal, glabrous area on midline on posterior fourth; behind glabrous area, metasternum terminates in an elongate triangular sclerite which extends part way between metacoxae on midline. Elytron with sutural stria; broad, moderately convex; shining; bearing 10 distinct

rows of very coarse punctures, a partial eleventh row laterally; epipleura wide and horizontal basally, narrowing abruptly and becoming almost vertical opposite third abdominal sternum. Scutellum an elongate triangle. Front and middle femora, except about apical eighth, densely covered on all surfaces with hydrofuge pubescence. Hind femur lacks hydrofuge pubescence on ventral surface but bears fine sparse punctures, each puncture bearing a short seta. Hind tibia not arcuate, without fringe of long natatory hairs. Tarsal formula 5-5-5. Middle and hind tarsi with first segment slightly shorter than second segment (Fig. 6).

Type-species of the genus.—Anticura flinti, new species.

Etymology.—Anticura, from the name of the lovely river from which adults, larvae, and pupa were collected. Gender: feminine.

This new genus keys to the subfamily Hydrobiinae in our latest keys to the higher categories of the Hydrophilidae, e.g., Crowson (1955) and Leech (1956). However, to compare this new taxon with previously described genera it is necessary to use d'Orchymont's (1942) revision of the taxa considered to belong to the tribe Hydrobiini at that time. In his study d'Orchymont provided a key to two divisions to which he referred as subtribes, i.e., the Hydrobiae and the Helocharae. The new genus, *Anticura,* belongs to d'Orchymont's subtribe Hydrobiae which corresponds roughly to our present concept of the Hydrobiinae. However, in *Anticura* the maxillary palpi are slightly longer than the antennae contrary to d'Orchymont's statement that the maxillary palpi are shorter than or as long as the antennae. Although some other characters used by d'Orchymont also disagree with those present in this new genus, those characters were included by him to accommodate the genera *Laccobius* Erichson, *Beralitra* d'Orchymont, and *Oocyclus* Sharp which do not belong in the Hydrobinae. After comparing adults and larvae of *Anticura* with adults and larvae of *Hydrobius* Leach, *Hydramara* Knisch, *Sperchopsis* LeConte, and *Ametor* Semenov (as well as with the rygmodine genera *Cylorygmus* d'Orchymont and *Rygmodus* White) and until a new key to world genera of the Hydrophilidae is available, I have interpolated this new genus into d'Orchymont's key to his Hydrobiae.

The new genus *Anticura* keys to couplet 7 in d'Orchymont's (1942:6) key to the genera of the subtribe Hydrobiae. The following modified couplets will separate *Anticura* from the other genera keying to d'Orchymont's couplet 7.

7a. Posterior femur without dense hydrofuge pubescence on ventral surface; middle femur with or without hydrofuge pubescence **7b**

– Posterior femur with dense hydrofuge pubescence on ventral surface; middle femur similarly pubescent **7c**

7b. Middle femur pubescent; deeply emarginate labrum hidden under deeply emarginate clypeus; Chile and Argentina . *Anticura,* new genus

– Middle femur not pubescent; labrum completely visible in front of clypeus; Australia ..... *Hybogralius*

7c. Anterior edge of pronotum shallowly emarginate; form more depressed; northwestern United States; China to Nepal **7d**

– Anterior edge of pronotum deeply emarginate; anterolateral angles of pronotum extending almost to anterior margins of eyes; form very convex; eastern United States and Southeastern Canada .... *Sperchopsis*

7d. Elytral intervals smooth between the dual punctures. Epipleuron not truly horizontal at base, rapidly bent and becoming more vertical; the metasternum and abdomen hidden in elytral cavity; mesosternal process moderately developed and projecting; China ... . *Hydrocassis*

– Elytral intervals never smooth, densely and uniformly scabrous or granulose; epipleuron nearly horizontal at base and becoming more so apically; metasternum and abdomen only slightly hidden in elytral cavity; mesosternum without projecting process or at most only slightly swollen between mid coxae; northwestern United States; China to Nepal ..... *Ametor*

Anticura flinti, new species
Figs. 1–25

Holotype male.—Body form (Fig. 1) broadly ovate. Length 6.5 mm; greatest width 4.0 mm, slightly behind midlength. Color above piceous except thinner margins of elytra dark reddish brown. Ventral surface piceous except as follows: antennae and apices of palpi light reddish brown; legs dark reddish brown. Entire venter (except legs) behind mentum densely covered with dark reddish brown hydrofuge pubescence.

Head shining but densely covered with coarse and fine intermixed punctures; coarse punctures about five times as large as fine punctures, becoming coarser and sometimes confluent especially between and behind eyes and to base of head; base sharply recessed for reception of anterior edge of pronotum; recessed area covered with hydrofuge pubescence continuous with that behind eyes and on ventral surface of head. Clypeus greatly expanded and shelflike in front of eyes, covering all but narrow anterior margin of labrum; strongly broadly emarginate apicomedially (Figs. 2, 3, 4). Labrum mostly hidden but narrow exposed portion strongly emarginate conforming to emargination of clypeus; bearing many dense punctures and short, stout setae on anterior margin. Ventral surface of head with microsculpture and pubescence except mentum, maxillae, and other appendages smooth; stipes of maxillae glabrous and finely sparsely punctate; mentum (Fig. 7) broadly and moderately deeply emarginate apicomedially and smooth except a few

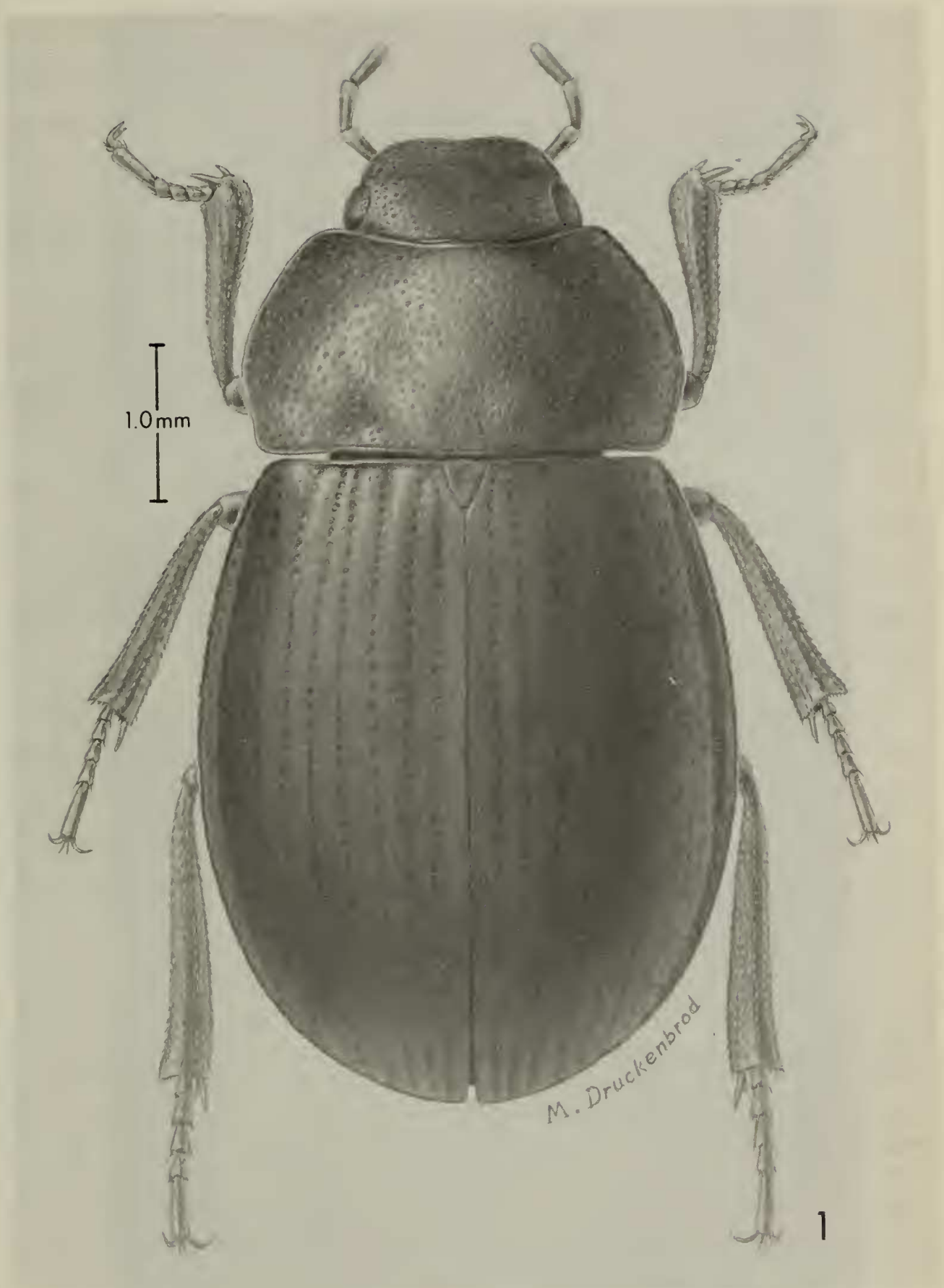
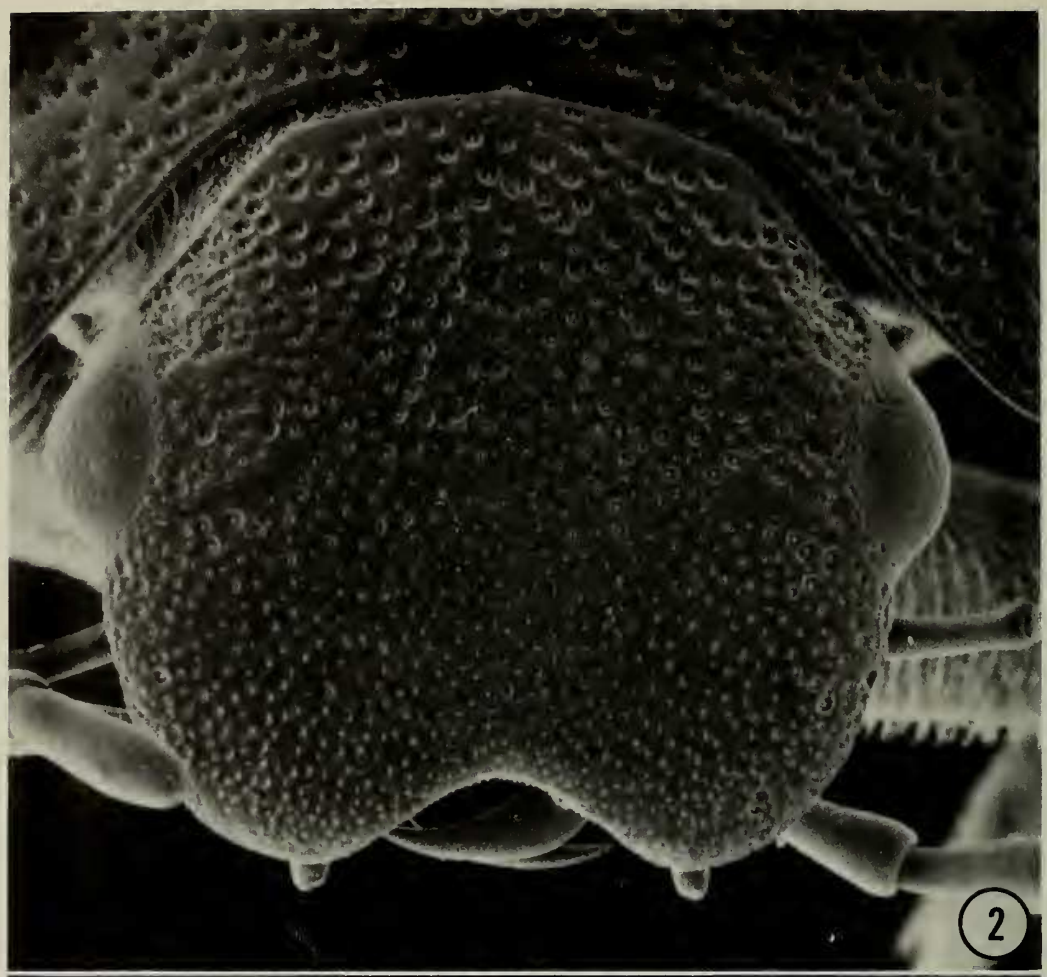


Fig. 1. *Anticura flinti*, n. gen., n. sp., ♂ holotype, habitus view.



Figs. 2–3. *Anticura flinti,* n. sp., head: **2**, Anterior view, 54×; **3**, Lateral view, 57×.

fine lateral punctures. Antenna (Fig. 4) 9 segmented; 2 basals, 3 intermediate, 1 cupule, and 3 club segments. Maxillary palpus (Fig. 4) 4 segmented; basal segment very short; second segment longest, about equal to third and fourth segments combined; penultimate segment slightly longer than ultimate segment, wider apically. Labial palpus small; 3 segmented; first segment short, about a fourth as long as second segment; second segment about as long as third segment but broader and bearing a tuft of long yellowish-brown setae along anterior edge; third segment almost parallel sided, only slightly wider apically.

Pronotum slightly more than twice as wide as long; strongly arcuate laterally; punctures much coarser than those on head and without fine intermixed punctures; punctures more dense laterally than on discal area; anterior, lateral, and posterolateral third of posterior edges finely margined; anterolateral and posterolateral angles strongly rounded; lateral edge of hypopleura with coarse, closely spaced punctures.

Scutellum an elongate triangle with base about three-fourths as long as sides; bearing 2 punctures.

Elytron with sutural stria; broad, moderately convex; shining; bearing 10 distinct striate rows of very coarse punctures, a partial eleventh row laterally; intervals impunctate; epipleura wide and horizontal basally, narrowing abruptly and becoming almost vertical opposite third abdominal sternum.

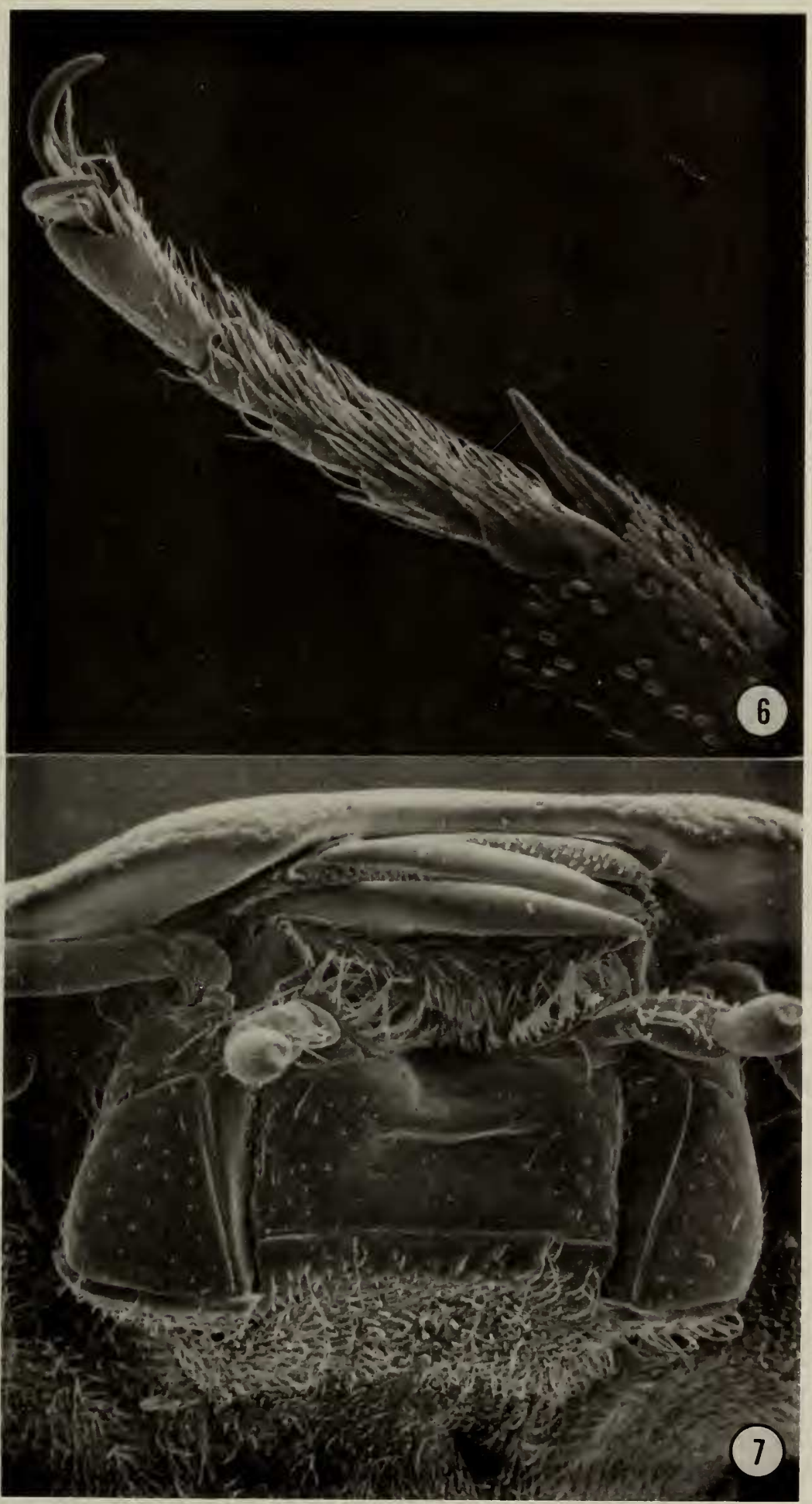
Prosternum almost flat medially, terminating posteromedially in an arcuate border and lacking a prosternal process. Mesosternum (Fig. 5) with short, feeble, longitudinal carina between apical halves of mesocoxae and behind a low, transverse, arcuate ridge across posterior third of mesosternum. Metasternum (Fig. 5) apically with short, narrow carina between and slightly behind posterior halves of mesocoxae; discal area higher than sides and bearing a narrow, longitudinal glabrous area on midline on posterior fourth. Behind glabrous area, metasternum terminates in an elongate triangular sclerite which extends part way between metacoxae on midline.

Front and middle legs with femur densely covered with hydrofuge pubescence on all surfaces except apical eighth glabrous. Hind femora lack hydrofuge pubescence on ventral surface but bear fine sparse punctures, each puncture bearing a short seta. Hind tibia not arcuate, without fringe of long natatory hairs. Tarsal formula 5-5-5. Middle and hind tarsi with first segment only slightly shorter than the second segment (Fig. 6). Foreleg with segments 1 to 4 about equal in length; last segment robust, swollen apically, and subequal to segments 1 to 4 combined. Midleg with segments 1, 3, and 4 equal in length; first segment about two-thirds as long as second segment; last segment robust, swollen apically, and about four-fifths as long as segments 1 to 4 combined; all tarsal claws long and robust.

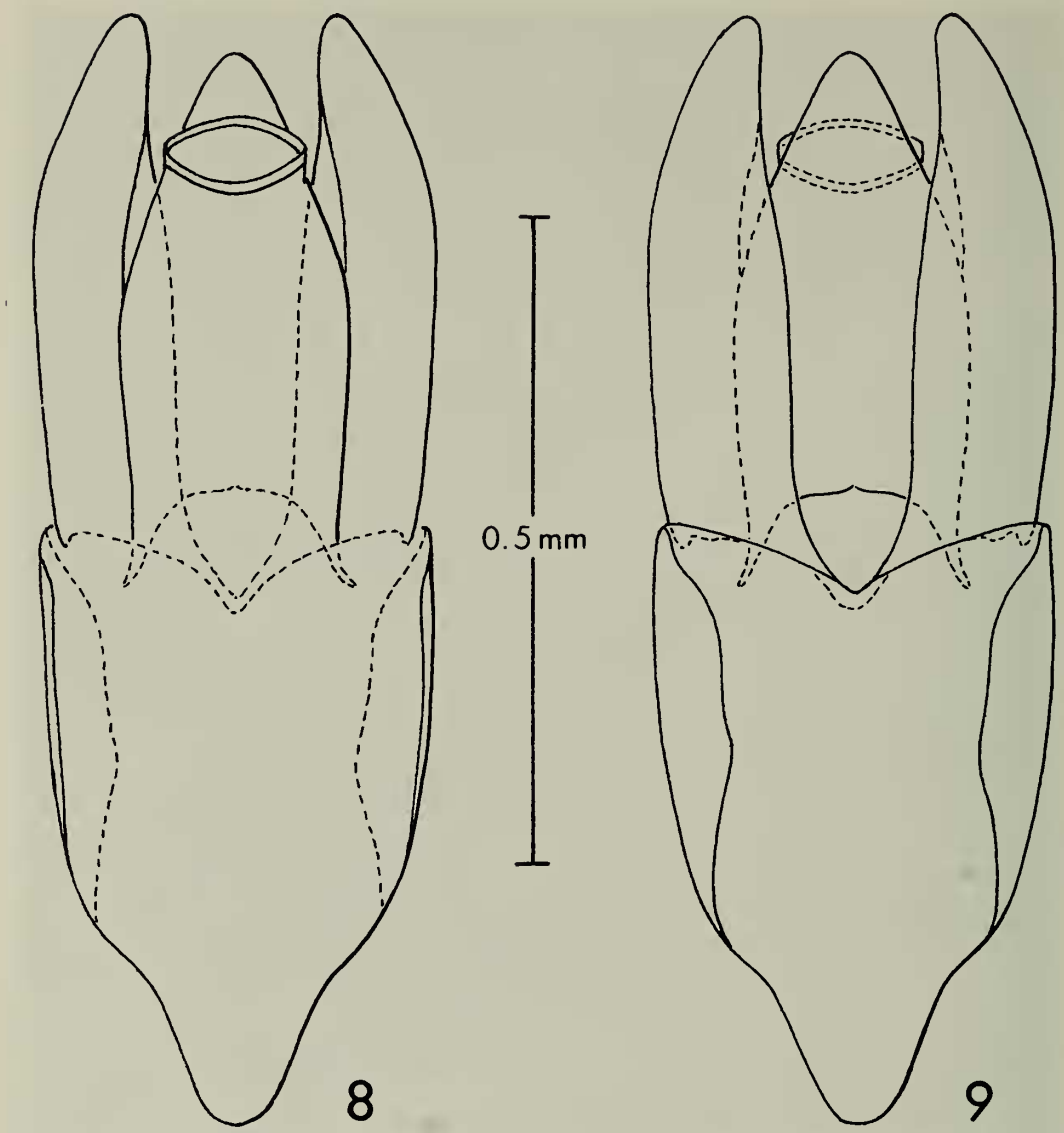
Abdominal sterna covered with hydrofuge pubescence. Last visible abdominal sternum rounded, not emarginate apicomedially.

Genitalia as illustrated (Figs. 8, 9).

Figs. 4–5. *Anticura flinti*, n. sp.: **4**, Antenna and maxillary palpus, 75×; **5**, Mesosternum, mesocoxae, and apex of metasternum, 110×.



Figs. 6–7. *Anticura flinti,* n. sp.: **6**, Hind tarsus, 75×; **7**, Head, ventral surface, 95×.



Figs. 8–9. *Anticura flinti,* n. sp., holotype, male genitalia: **8**, Ventral view; **9**, Dorsal view.

Allotype.—Similar to male; no external sexual differences could be found.

Variations.—The only variations evident among the specimens in the type-material are the usual color and size differences. Teneral specimens are light brown to dark reddish brown instead of piceous as in older specimens. Also, the specimens vary in size as follows. Male: length, 5.0 to 6.1 mm; width, 3.4 to 4.0 mm. Female: length, 6.0 to 6.6 mm; width, 3.8 to 4.5 mm.

Etymology.—I am pleased to dedicate this new species to my friend Dr. Oliver S. Flint, Jr., who collected the first specimen of this species and who has collected many other aquatic Coleoptera for me during his many field excursions.

Type-data.—Holotype male: CHILE: Osorno Province, Anticura, Puyehue National Park, in Rio Anticura, 2 Feb. 1978, Paul J. Spangler, USNM Type No. 75765, deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Allotype: Same data as holotype.

Paratypes: ARGENTINA: Neuquen Province, San Martin de los Andes, Arroyo Rosales, 22 Jan. 1974, O. S. Flint, Jr., 1 ♀. CHILE: Same data as holotype, 20 ♂♂, 12 ♀♀; Osorno Province, Anticura, Puyehue National Park, in Rio Gol Gol, 1 Feb. 1978, Oliver S. Flint, Jr., 1 ♀; Osorno Province, Puyehue National Park, Anticura, in Rio Anticura, 3 Feb. 1978, Paul J. Spangler, 6 ♂♂, 11 ♀♀; Osorno Province, Puyehue National Park, Aguas Calientes, in Rio Chanlefu, 8 Feb. 1978, Paul J. Spangler, 2 ♀♀; Osorno Province, Puyehue National Park, Anticura, in Rio Anticura, 11 Feb. 1978, Paul J. Spangler, 14 ♂♂, 6♀♀.

Paratypes will be deposited in the following entomological collections: American Museum of Natural History, New York; British Museum (Natural History), London; California Academy of Sciences, San Francisco; Canadian National Collection, Ottawa; Institut für Pflanzenschutzforschung Zweigstelle, Eberswalde; Museo Argentino de Ciencias Naturales, "Bernardino Rivadavia," Buenos Aires; Museo National de Historia Natural, Santiago; Museum für Naturkunde, East Berlin; Museum National d'Histoire Naturelle, Paris; Institut royal des Sciences naturelles de Belgique, Brussels; and Zoologische Sammlung Bayerischen Staates, Munchen.

Description of Third-instar larva
Figures 10–19

Body elongate (Fig. 10). Total length, 14.8 mm; width of prothorax 1.7 mm. Color of integument grayish brown. Sclerotized head capsule, thoracic sclerites, spiracles, and legs yellowish brown. Integument covered with asperities whose apices are oriented posteriorly but otherwise disarrayed.

Head (Fig. 12) quadrangular, 1.6 mm wide, 1.2 mm from labroclypeus to occipital foramen. Frontoclypeal suture feebly indicated. Frontal sutures united near base of head forming an epicranial suture. Frons sagittate. Cervical sclerites present, rectangular. Ventral surface of head with numerous setae laterally, glabrous medially except a short row of 3 slender setae basolaterally on each side of midline; with 2 deep, approximate, posterior tentorial pits behind gula.

Labroclypeus (Fig. 14) prominent, almost symmetrical; with 2 large medial teeth, left tooth slightly shorter than right tooth; 4 stout setae present, 1 on each side of each tooth. Anterolateral projections of epistoma shorter than teeth, left projection slightly shorter than right; both projections subangular anteromedially, broadly rounded anterolaterally, and both bearing a few short setae on anterior margins.

Ocular areas each with groups of 6 distinct ocelli arranged in an ellipse; anterior 3 ocelli larger and close to each other; posterior 3 ocelli smaller, ventrolateral one smallest and separated from posteromedial two.

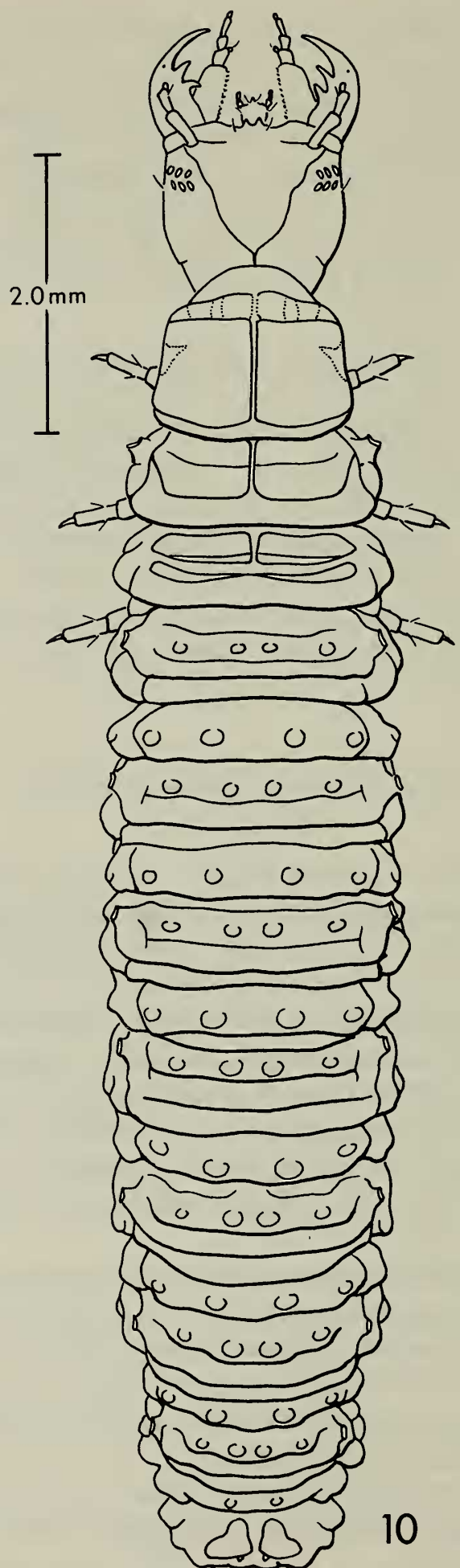


Fig. 10. *Anticura flinti*, n. sp., larva, habitus view.

Antenna (Fig. 19) 3 segmented, short, cylindrical, shorter than stipes; first segment longest, about one-third longer than penultimate segment; penultimate segment with small apicolateral tubercle and a long slender apicomedial seta; ultimate segment small and slender, about one-fifth length of penultimate segment and bearing a distinct, slender, distal seta and a minute apicolateral appendage.

Mandible (Figs. 11, 13) symmetrical, prominent, stout, sharply pointed apically; each with 2 large well-defined inner teeth and 1 large distal tooth; molar area rounded.

Maxilla (Fig. 16) with stipes stout, elongate, tapering distally, bearing a row of 12 or 13 stout setae on inner margin. Palpiger segmentlike, with slender sclerotized appendage on apicomedial angle about one-third as long as palpiger; bearing 1 long seta medially below appendage; appendage of palpiger bearing an apical seta. Palpus 3 segmented, tapering distally; first segment short, about half as long and about half as wide as palpiger; penultimate segment longest, twice as long as basal segment and bearing 1 lateral seta at about apical third; ultimate segment conical, about half as long as penultimate segment and bearing 1 basomedial seta.

Labium (Fig. 17) extending about to midlength of stipes. Penultimate segment of palpus short and broad; ultimate segment not quite twice as long as penultimate segment. Ligula distinct, about a third longer than penultimate palpal segment and bearing a basal seta at each lateral corner. Mentum subquadrangular, glabrous except 1 lateral and 1 ventrolateral seta, wider than submentum, arcuate laterally, narrowing posteriorly; dorsal surface spinose; with numerous setae on anterior edge; ventral surface glabrous except for apicolateral setae.

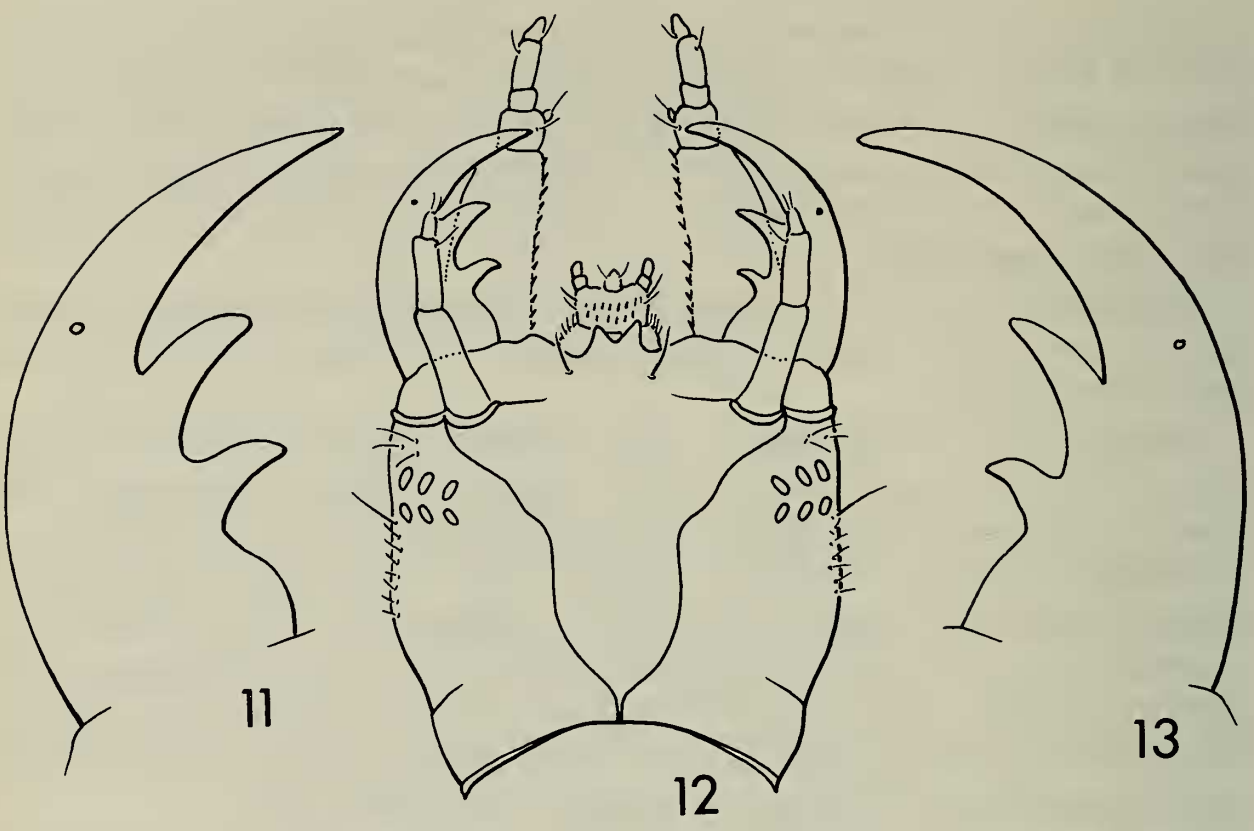
Gula pentagonal, rounded posteromedially.

Prothorax with sides nearly straight but diverging posteriorly; posterolateral angles broadly rounded, with a few short setae; anterolateral angles each with a few long setae and a few short setae; sagittal line present. Prosternal sclerite large, subrectangular, with no indication of sagittal line.

Mesothorax wider than prothorax and about half as long (measured on midline) as prothorax; with 2 small, very narrow, straplike, anterior sclerites and 2 large, subrectangular mesotergal sclerites; lateral margins each with a prominent spiracular tubercle which is followed by a sparsely setiferous lobe; sagittal line present.

Metathorax slightly wider than and about as long as mesothorax; anterior metatergal sclerites transverse, larger than posterior sclerites, irregularly rectangular; posterior sclerites small, narrow; sagittal line present.

Legs four segmented; procoxae large, separated by about length of a trochanter; trochanter as long as femur (viewed ventrally); femur about as long as tibiotarsus; tarsal claw single, ventrally bearing 2 large robust setae at basal third.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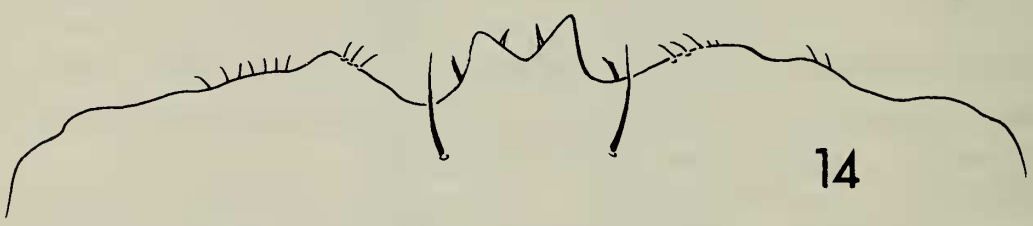
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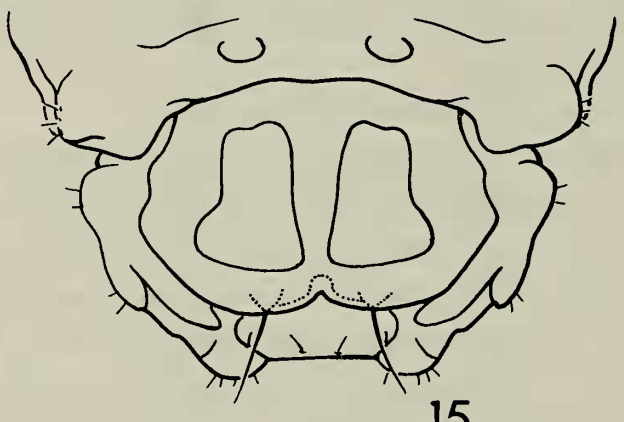
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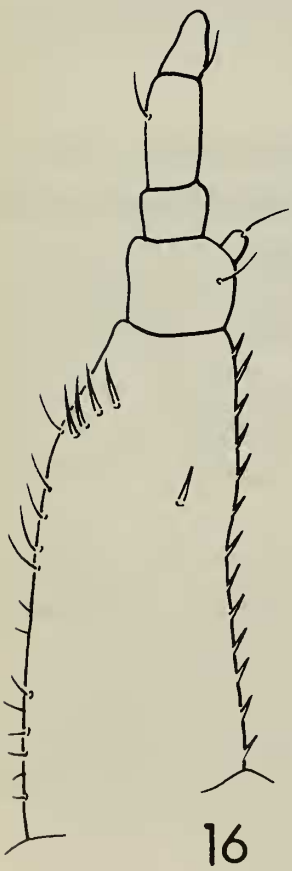
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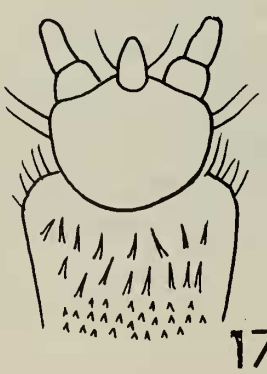
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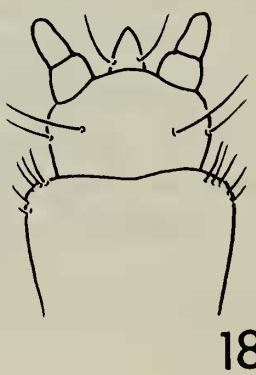
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Abdomen of 8 distinct segments, ninth and tenth segments reduced; terga similar to each other and separated by an intersegmental membrane. True segmentation obscured by additional transverse folds on segments, segmental folds continued onto sternum. Each segment with 4 folds; anterior fold with 4 small setose tubercles; second and third folds without tubercles; fourth fold with 2 large medial tubercles and 2 smaller lateral tubercles. All tubercles are densely covered with asperities. A large spiracular tubercle present on each side of segments 1 through 7. Epipleurites and hypopleurites prominently lobed. Eighth tergum represented by superior valve of stigmatic atrium which bears 2 large sclerites (Fig. 15), beneath which lies the eighth pair of abdominal spiracles. Ninth tergum trilobed. Middle lobe large; with 2 short, stout setae, 1 on each side of median line on caudal margin. Lateral lobes small, about a fourth as wide as median lobe; each bearing 2 elongate, slender setae on posterior margin.

Specimens examined (30): All from CHILE, Osorno Province, Puyehue National Park: Anticura, in Rio Anticura: 1 Feb. 1978, 2 larvae; 2 Feb. 1978, 15 larvae; 3 Feb. 1978, 4 larvae; 11 Feb. 1978, 6 larvae. Aguas Calientes, in Rio Chanlefu: 7 Feb. 1978, 1 larva; 8 Feb. 1978, 2 larvae.

The larva of *Anticura flinti* traces to couplet 23 in Bertrand's (1972:263) generic key to hydrophilid larvae. However, *Anticura* may be distinguished from the two choices available at this point by inserting the following modified couplet there.

23a. Labroclypeus with 2 teeth ..... *Anticura*, new genus
– Labroclypeus with 4 or 5 teeth 23b
23b. Labroclypeus with 4 teeth *24*
– Labroclypeus with 5 teeth *26*

Description of Pupa
Figs. 20–21

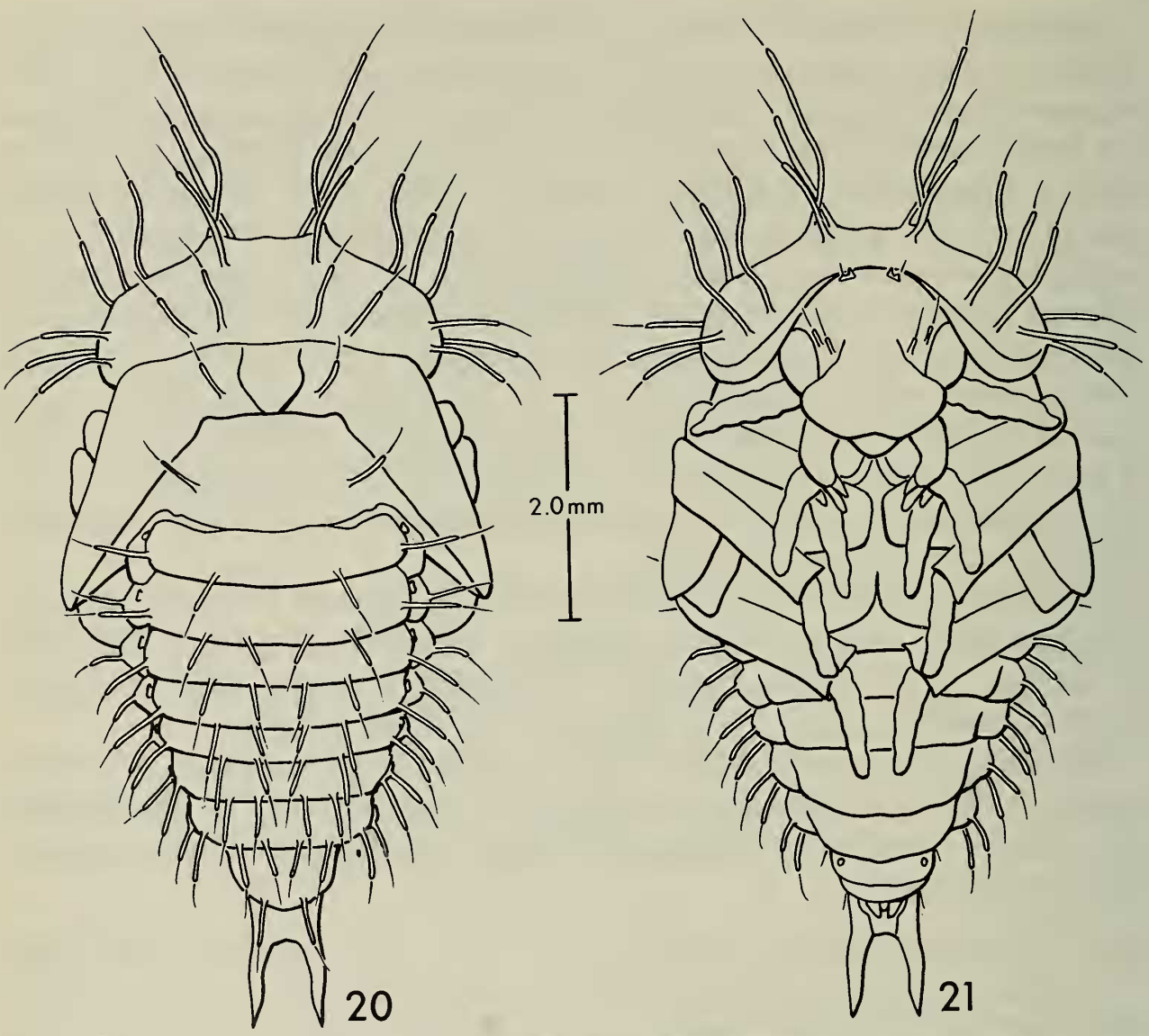
Total length 10.4 mm, greatest width 4.5 mm. Color white except styli and cerci light yellowish brown. Glabrous except for setae and styli described below.

Head with 2 supraorbital styli above each eye and 1 (possibly 2) short seta on each side of midline on vertex.

Pronotum with 22 styli as follows: 3 on each anterolateral angle, 2 on each side of median line on anterior margin, 3 on each posterolateral angle, 2 on each side of median line at posterior margin and 1 on each side of median line on disc. Mesonotum with 2 styli, 1 on each side of scutellum. Metanotum with 2 styli, 1 on each side of midline.

←

Figs. 11–19. *Anticura flinti*, n. sp., larva: **11**, Left mandible; **12**, Head; **13**, Right mandible; **14**, Labroclypeus; **15**, Stigmatic atrium; **16**, Maxilla; **17**, Labium, dorsal view; **18**, Labium, ventral view; **19**, Antenna.



Figs. 20–21. *Anticura flinti,* n. sp., pupa: **20**, Dorsal view; **21**, Ventral view.

Abdomen with 4 styli on first segment; second to seventh segments each with 1 pair of pleural and 6 tergal styli (total 8) arranged as follows: 1 pleural stylus lateral to each spiracle, 1 stylus behind each abdominal spiracle, and 2 styli between each spiracle and midline. Segment 8 with 2 styli on posterior margin, 1 on each side of midline. Segment 9 with 2 cerci slightly longer than basal width of segment 9, each cercus terminating in a single stout seta.

First to seventh abdominal segments each with a pair of spiracles; those on segments 1 and 7 reduced, especially so on the seventh segment.

Antennae and femora extending outward at right angles from body axis. Tibiae of all legs folded back against their respective femora. Tarsi turned backward and parallel with body axis, those of front and middle legs widely separated, hind tarsi approximate.

The partially developed parameres and median lobe of the male genitalia visible at the apex of the abdomen show that the pupa described above is a male.

Specimen examined: CHILE, Osorno Province, Puyehue National Park, Anticura, in Rio Anticura, 11 Feb. 1978, 1 pupa.

The pupa (Figs. 20, 21) of *Anticura* keys to couplet 9 (i.e., *Ametor*) in Bertrand's (1972) key to hydrophilid pupae, but it may be distinguished from *Ametor* immediately because the pupa of *Anticura* has 22 instead of 20 pronotal styli and 1 pair of pleural and 6 tergal instead of 1 pair of pleural and 4 tergal styli as are present on *Ametor*.

Pupation

Pupation occurs in loam in pupal chambers out of water as is characteristic for most hydrophilids whose biologies are known. The single pupa I found was in a chamber in loam mixed with a few leaves caught between two rocks, i.e., not in a typical logjam habitat. Several teneral and very lightly pigmented adults were found in loam in one logjam.

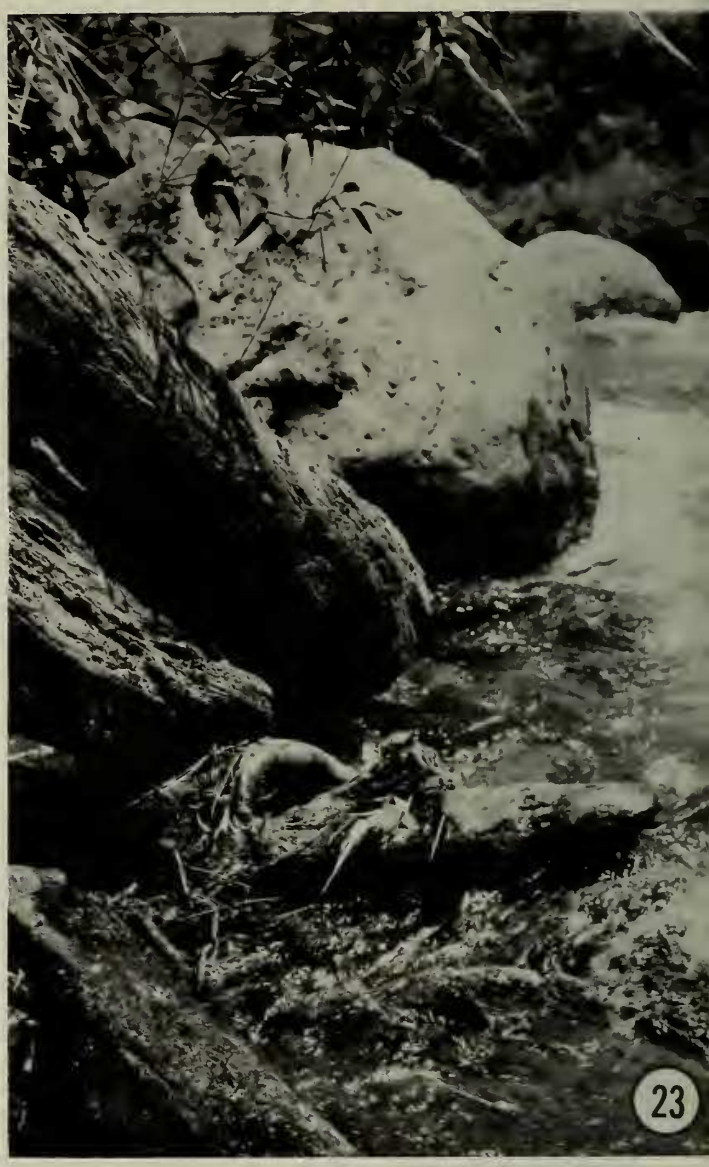
Habitat

Almost all of the specimens of *Anticura flinti* were collected in logjams (Figs. 22, 23) where logs, sticks, twigs, leaves, as well as loam were deposited and compacted by the current. Occasionally grasses or other plants were growing in this compacted debris, their roots binding the debris in a matlike fashion. All of the larvae were found on the sticks or logs in the logjams. Adult beetles were found on the logs or in cracks and crevices in the logs, among the compacted leaves and roots, and occasionally on rocks present under the matted roots. Several adults were found along the underside of a single large log, one end of which was shallowly imbedded in the loamy stream bank. Because many of these logjams were situated where there was considerable current, some beetles were washed away as their habitat was necessarily destroyed in the process of searching for them. One adult collected by Dr. Flint was found several feet from water under a rock on a sandy shore in a branch of the Gol Gol River. That beetle apparently retreated to the damp sand there as the water level in the stream dropped drastically leaving only small isolated pools in the streambed.

During the day when I collected the specimens of *A. flinti,* the air temperature varied from 54°F to 71°F. The water temperature varied from 44°F to 48°F. The rivers in this area flow through rocks of volcanic origin. Colorimetric water testing methods for pH and hardness indicated the following: pH 5 and 0 grains per gallon for the Rio Anticura. Specimens were collected at altitudes ranging from 330 to 700 meters.

Behavior

Larvae found on sticks moved slowly but kept their jaws open and head



Figs. 22–23. *Anticura flinti,* n. sp., habitat: **22**, Rio Anticura at type-locality; **23**, Logjam biotope.

moving back and forth from side to side as they actively searched for prey. Larvae seemed to wash loose rather easily from their footholds in contrast to the adults which were often in crevices in logs or in the matted debris and not easily dislodged. However, those adult specimens disrupted from smaller sticks or under the edges of mats often dropped off into the water where the current caught them and whisked them away. When disrupted in the logjam adults usually feigned death and remained motionless for varying lengths of time. When they became active again they moved rather slowly and in short, sometimes jerky movements. Adults that were dislodged into the stream or that were placed in small artificial pools of water floated about inactively until they bumped against an object or the shoreline, then they grasped any convenient foothold and tried to crawl away and hide or burrow into coarse sand. None attempted to swim.

Collecting Methods

At first I pulled logs, sticks, rocks, matted roots, etc., slowly out of the logjam while watching for larvae and adults. However, after losing several specimens of this rare beetle into the current I moved only the large logs and then gathered all of the debris or as much as possible in one or a few handfuls and placed this material on a square meter of nylon cloth on the shore. I then collected the exposed larvae and adults immediately. As the sun heated and dried the debris, other specimens became active and were then easily seen moving and were collected.

Wing Dimorphism

Although the majority of insects have fully developed wings and are capable of flight, some are brachypterous and unable to fly. The ability or inability to fly obviously affects the vagility and survival of the species depending upon its habitat. In aquatic beetles, most taxa have normal and functional wings. Therefore, it is very interesting to find exceptions to the usual condition. Little information is available on wing dimorphism in the family Hydrophilidae because, as Jackson (1928) reported in a brief summary, wing dimorphism seems to be very rare in this family. In an interesting study of wing atrophy in the family Carabidae, Darlington (1936) reported that he had examined a considerable number of aquatic and semiaquatic beetles in the families Amphizoidae, Omophronidae, Haliplidae, Dytiscidae, Gyrinidae, Hydrophilidae, Psephenidae, and Heteroceridae without finding a single eastern American species without normal flight wings except the dytiscid *Ilybiosoma bifarius* (Kirby). Reporting on flight in water beetles, Jackson (1952) noted that in the Hydrophilidae (*sensu lato*), the species *Helophorus ytenensis* Sharp, *Hydraena minutissima* Stephens, and *Hydraena pygmae* Waterhouse have abbreviated wings. Since Jackson's paper appeared in 1952, hydraenid beetles have been removed from the family Hydrophilidae and have been placed in their separate family, the Hydraenidae. Furthermore, *Helophorus* is variously placed in a separate family or subfamily by some authors. Therefore, the only uncontested species with reduced flight wings presently included in the Hydrophilidae (*sensu stricto*) seems to be *Coeloctenus seriatus* Balfour-Browne from Africa. When this species from the shores of Lake Tanganyika was described by Balfour-Browne (1939) he reported that in his specimens "the flight wings are reduced to mere functionless slips." Balfour-Browne further stated that "the reduction of the wings is a feature of great interest, conceivably correlated with the habitat, since reduced wings are less likely to impede the insect in the event of involuntary raising of the elytra in rough water." Therefore, the discovery of both normal (Fig. 24) and reduced (Fig. 25) wings in *Anticura flinti,* represents the second species in the Hydrophilidae (*sensu stric-*

to) with flightless specimens and apparently the first with both normal and reduced wings in the same species.

The presence of normal and reduced flight wings in *Anticura flinti,* was discovered by chance because having seen the flight wings extended beyond the elytra in some specimens I had preserved in alcohol, I assumed they all had normal flight wings. However, after having pointed and labeled many of my specimens I decided to remove for study a flight wing from a specimen with a broken elytron. Upon lifting both elytra I discovered only the vestigial wing on both sides of the metanotum. Consequently, I examined the 36 unmounted specimens and found that 31 had reduced and flightless wings and only 5 had normally developed wings. Of the 31 with reduced wings, 20 were males and 11 were females. Of the 5 specimens with normal wings, 3 were males and 2 were females. Three of these 5 winged specimens were teneral and very lightly pigmented suggesting that they had enclosed probably within the previous 24 to 48 hours.

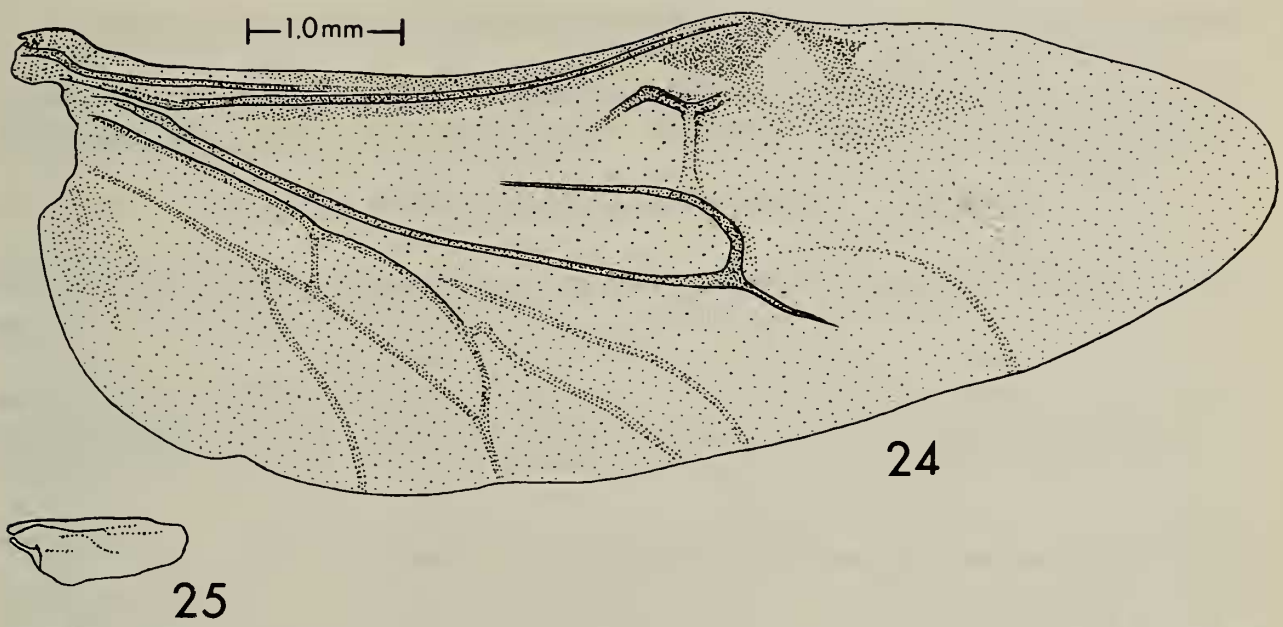
Unfortunately, I had only 5 beetles remaining in alcohol with normal wings and preferring to keep them as paratypes I did not dissect any to try to decide whether their flight muscles were developed sufficiently for flight.

For beetles living in mountain streams like the Rio Anticura, Rio Chanlefu, and Rio Gol Gol, the ability to fly would be a definite advantage because the polished rocks and numerous piles of huge *Nothofagus* and other tree trunks in these streams (Fig. 22) attest to the apparently common scouring of these streambeds by high water. The distribution of the hydrofuge pubescence present on *A. flinti* and personal observations verify that this species carries a bubble of air over most of its ventral surface and in the air pocket beneath its elytra when it submerges as is usual for other hydrophilids. Therefore, unlike elmids which can obtain their air by means of plastron respiration and need not surface, *A. flinti* must surface periodically to replenish its air supply. This need to surface for air amidst the physical force of the fast current during floods would be detrimental to the survival of the flightless specimens of this species.

Considering the above circumstances it seems probable that normal-winged individuals, although low in numbers, are capable of flying and are the main source of dispersal of this species from stream to stream. After a population becomes established in a stream the species probably spreads downstream by drifting of the larvae and flightless specimens and, certainly to some extent, by flight by the winged specimens. Further studies of wing dimorphism, generations per year, dispersal, genetics, and distribution in this species should be very interesting and illuminating.

Acknowledgments

I am grateful to Luis E. Peña G. who was responsible for organizing the



Figs. 24–25. *Anticura flinti,* n. sp., metathoracic wing: **24**, Normal wing; **25**, Vestigial wing.

cooperative fieldwork between the J. I. Molina Institute of Studies and publications of Chile and the Smithsonian Institution during which this new genus was collected. Furthermore, his knowledge of Chile and its flora and fauna, his experience in fieldwork, his culinary delights, and his keen sense of humor made him an ideal leader for the project. I am also pleased to acknowledge the financial support received from the J. I. Molina Institute and the gracious hospitality and friendship extended to me by members of the Institute who were able to meet with us and participate in some of the fieldwork.

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